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belong, and he is to a certain extent endogamous in relation to the tribe to which he belongs, that is, he must marry within that tribe; but in all cases, if his marriage is the result of legal appointment, he is greatly restricted in his marriage rights, and the selection must be made within some limited group. Exogamy and endogamy, as thus defined, are integral parts of the same law, and the tribes of mankind cannot be classed in two great groups, one practising endogamy, and the other, exogamy.

The law of exogamy is universal. Among all peoples there is a group, larger or smaller, and natural or artificial, within which marriage is prohibited. The terms 'exogamy' and 'endogamy' are misleading, and should be discarded.

J. W. POWELL.

A SCIENTIFIC STUDY OF LAWN-TENNIS.

LAWN-TENNIS is a game which has taken firm hold upon Americans, and is becoming more popular every year. It is claimed to possess the qualities which make a perfect game, being safe, healthful, not insuperably difficult, and alike interesting to 'duffer' and expert, provided the two are not matched. The use of the 'cut' and of slow returns having been given up for drives, volleying, and swift returns, it has ceased to possess the reproach once cast upon it of being a ladies' game, and is admitted to call forth science, skill, and endurance. Lawn-tennis puts upon its players a demand for muscular quickness and elasticity, great self-control, and a fine and peculiar development of the muscular sense.

It is by the help of this sense that the ball is returned with just the right force and in just the right direction, no matter how hard or how gently it strikes the bat; and in tennis the peculiarity lies in the fact that delicate muscular adjustments must be made at the same time that violent contractions of the muscles take place. The skilled artisan goes slowly and gently over his delicate work. The juggler performs his tricks with light and easily handled articles. The billiard-player has to use comparatively little force to make his brilliant strokes. The tennis-player, however, must be ready to strike hard or softly while gripping the racket, adjusting it at just the right angle, and driving it in just the right direction.

Man experiences a curious sensation of pleasure in thus developing and exercising his mus-

cular sense. The delight felt over a good shot, a brilliant catch, an unexpected return, — all come in the main from this same source, which we might almost call the 'sporting sense.'

The physiology of muscular co-ordination has been much studied, but its relation to aesthetics is, perhaps, not as yet 'worked up:' therefore I will dwell upon this point a little.

Every phase and degree of muscular contraction registers itself in the brain; but when these contractions, in obedience to the will, effect a certain delicate, previously conceived result, a thrill of pleasure is felt, which is not wholly mental satisfaction over success; it is also an intensified muscular sensation. As the eye delights in beautiful colors, and the ear in sweet music, so the muscles rejoice in delicate adjustments. They have their own aesthetics: hence there have always been athletic sports, and hence even pugilism would have no charm if it were mere slugging.¹ The Greeks cultivated this sense as actively as that for poetry, sculpture, and architecture: we might do well to imitate them.

It is true that the muscular sense is not the only factor in measuring distance and adjusting muscular movements. The eye, the ear, and the tactile, more especially the pressure, sense, also come into play. But setting aside the zest of competition, the joys and sorrows of beating or being beaten, it is to certain sensory nerves, distributed through muscle and tendon, that we must attribute much of the pleasure got from athletic games. This may be shown in still another way. After the frequent repetition of a set of muscular contractions, the sensations excited thereby cease to rise into consciousness. Perhaps this is due, as Ribot suggests, in part to their increased number, and briefness of duration. At any rate, we know that a frequently repeated act of muscular skill finally comes to be done almost automatically and with little intervention of consciousness. So it is that with skilled players the minor and easy strokes of the game call out no new, complex, and delicate adjustments with the corresponding aesthetic excitement.

Every one who has ever attained any special skill in athletic games knows the pain and weariness of playing with the beginner. What hours of heroism in love's cause have been spent by old tennis-players in teaching the non-

¹ I am quite aware that some physiologists consider part of the muscular sensations to be central in origin (innervation feelings), starting up with the volitional impulse, and accompanying it, as it were, to the muscle. It is simply inconceivable, however, that we can be conscious of muscular contractions that have not yet been made.

co-ordinated musculature of fair young maidens to serve and return the ball! The reason is plain enough to the player; but, put in physiological terms, it supports the view I have suggested as to the aesthetic function of the muscular sense.

The muscular mass of the human system is a large one. It makes up forty per cent of the total bodily weight; and leaving out the skeleton, which has a mechanical function only, we are two-thirds muscle. Besides, it is supplied throughout with the nerves which excite it, and with sensory nerves, which notify the brain at once of use and misuse, sickness and health. There may be a fair state of health, but there can be no exuberant vigor, none of the lusty *joie de vie*, without perfectly nourished and perfectly functioning muscles. Thus, when over-used or poorly nourished, we have the sensations of fatigue, weariness, and *malaise*, such as are complained of by thousands of underfed and underworked persons. Furthermore, as the muscle retires, the nerve comes to the front, and we get our nervous women, who are the products, in large part, of insufficient or improper muscular exercise.

There are a few pathological facts in connection with lawn-tennis which may be briefly noted:—

Every new invention and every new sport has its accidents and diseases. For some time English medical journals have had letters about 'lawn-tennis arm,' 'lawn-tennis elbow,' and 'lawn-tennis leg.' The cause of these troubles is generally simple. 'Tennis arm' is caused by a rupture of some of the fibres of the *pronator radii teres*. The front of the fore-arm is tender, perhaps swollen, while pronation and flexion are difficult. In some forms of 'tennis arm' the musculo-spiral nerve, as it passes around the elbow, gets pinched and injured; then there is weakness in extension and in 'back-hand' strokes. In 'lawn-tennis wrist' the anterior part of the annular ligament is stretched, and there is probably a little inflammation of the grooves in which the flexor tendons run.

'Lawn-tennis leg' is due to rupture of some of the muscles of the calf in swift and powerful serving. The muscle ruptured is thought to be the *plantaris longus*.

These 'legs' and 'arms' are more apt to occur in middle age and among too ambitious beginners. They are not of frequent occurrence, and are not dangerous. Rest, rubber bandages, friction, and electricity are sure to bring about a cure.

C. L. DANA, M.D.

New York.

LATE NEWS FROM THE NORTH-WEST.

LATE advices from Alaska state that the volcano on Augustine Island, Cook's Inlet, continues to show signs of activity by smoke, noises, and earthquake shocks of light intensity. About the time of the eruption last autumn, between the 23d of September and the 18th of October, eight shocks were felt at Port Etches, in Prince William Sound. At Kasiloff, on the eastern shore of Cook's Inlet, at the mouth of the river of the same name, on the 14th of November, 1883, a tidal wave flooded the salmon-canning establishment of Cutting & Co., and washed away a considerable strip of bluff along the shore for several miles.

Edward Langtry, one of the early explorers of the Lewis branch of the Yukon, in the Chilkat country, has been prospecting on the Kuskokwim and Nushagak Rivers during the past year, and intends to remain another season.

News from the explorers of the Copper or Atna River indicates that they were in July detained at a point where the river passes through a narrow cañon, and a glacier abuts upon it. This glacier, extending over the surface of the stream, nearly closed it to navigation, and an arrangement had just been completed with some of the natives, who were to assist the party to cross the glacier.

News has been received of the return of Lieut. Stoney from his explorations on the Kowak River, emptying into Hotham Inlet, Kotzebue Sound. He had ascended this river, which has been known for thirty years, but never surveyed, to a distance which he estimates at four hundred miles, which is probably meant to include all irregularities. He did not reach its source, as his instructions forbade him to winter there. He has forwarded a report to the Navy department. A party from the revenue-steamer Corwin has also ascended the river this season, and in 1881-82 Messrs. Jacobsen and Woolfe explored its course for some fifty miles. The former has just published at Leipzig an account of the journey under the editorial supervision of Dr. Woldt, a work which has not reached us. The following year Lieut. Stoney, furnished with a boat and party from the revenue-steamer Corwin, Capt. Healy, on which he was a passenger, made some praiseworthy investigations at the mouth of the Kowak and the entrance of Hotham Inlet. These gave rise to some unfounded reports in the daily press that the river was a new discovery. The extent of the stream, leaving minor curves out of account, cannot much exceed two hundred and fifty geographical miles; but it runs through an almost unknown region, and the official reports will, no doubt, add materially to the geographical knowledge of that part of Alaska.

A trading-post has been established at Yakutat Bay by the Alaska commercial company,—the first which has existed there since the destruction by the Indians of the old Russian settlement of 'New Russia' about eighty years ago. The natives have always been treacherous and unreliable. The establishment will be conveniently situated for any adven-